



Isogawa et al.

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TITLE: Image projector e.g. OHP - has reflective LC panel by which light from light source and image reproduced from video cassette are superimposed and projected on screen

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PATENT-FAMILY:

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INT-CL (IPC): G03B021/132

ABSTRACTED-PUB-NO: JP 10307331A

BASIC-ABSTRACT:

The projector has a video cassette (6) which stores image picked up by an image pick-up unit. A light source (9) radiates light beam on a reflective LC panel (2). The light from the light source and image reproduced from the video cassette using an amplifier (5) and video RAM (3), are superimposed by reflective LC panel and projected on a screen (13).

ADVANTAGE - Superimposes several types of image.

CHOSEN-DRAWING: Dwg.1/5

TITLE-TERMS: IMAGE PROJECT OHP REFLECT LC PANEL LIGHT LIGHT SOURCE  
IMAGE

REPRODUCE VIDEO CASSETTE SUPERIMPOSED PROJECT SCREEN

DERWENT-CLASS: P82 S06 W04

EPI-CODES: S06-B06A; W04-M01J; W04-Q01B;

SECONDARY-ACC-NO:

Non-CPI Secondary Accession Numbers: N1999-041897

## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to image projection equipment.

[0002]

[Description of the Prior Art] OHP (overhead projector) is widely used as equipment for projecting conventionally the image (image sheet) drawn on the plane transparence form on a large-sized screen. Such projection equipment makes parallel light light by which outgoing radiation was carried out from the light source with a lens, makes an image sheet penetrate, and has structure which expands the flux of light which was made to reflect with a reflecting mirror further and was turned, and is projected on a large-sized screen.

[0003] Furthermore, expanding the electronic image by a computer etc. and projecting on a screen comes to be called for, and it uses a high-reflective-liquid-crystal light modulation element as a reflecting mirror in recent years that it should correspond to this. While displaying the electronic image by the computer on this high-reflective-liquid-crystal light modulation element By reflecting the flux of light from the light source which penetrated the aforementioned image sheet by this high-reflective-liquid-crystal light modulation element, the reflected light is modulated with the image displayed on liquid crystal, and the configuration which projects this on a screen has come to be proposed.

[0004] Drawing 5 shows the example of the projection equipment with which such a reflective mold liquid crystal panel was incorporated as a reflecting mirror, and the OHP sheet 208 is penetrated, it is extracted with a lens 205, it results in the reflective mold liquid crystal panel 206, it is reflected here, and the beam of light emitted from the light source 204 in the frame 203 of projection equipment 200 is expanded according to optical system 207, and, according to this drawing, has composition projected on a screen 209.

[0005] On the other hand, the personal computer 201 is connected to the reflective mold liquid crystal panel 206 via the path cord 202, and the image which a personal computer 201 emits is displayed on the reflective mold liquid crystal panel 206.

[0006] Consequently, the beam of light modulated by the image drawn on the OHP sheet 208 by penetrating the OHP sheet 208 receives a modulation in piles with the image currently displayed on the reflective mold liquid crystal panel 206, in case it is reflected with the reflective mold liquid crystal panel 206, when the beam of light modulated with both image of these is projected on a screen 209, will be superimposed on both images and will appear on a screen 209. Thus, the image which a personal computer 201 emits in the image of an OHP sheet is compounded, and expansion projection is carried out.

[0007]

[Problem(s) to be Solved by the Invention] By the way, although such a function was convenient, it was still functionally inadequate. For example, in sites, such as the hall where image projection equipment is used, although it not only projects an image sheet while in use, but the case where he wanted to carry out expansion projection was in the screen on that spot about the raw image of a body or a photographic subject by the presentation etc., such a function was not able to be satisfied with the conventional configuration. Furthermore, the function which compounds or superimposes the image by the image sheet and the image picturized in presence on that spot, and is made to project on a screen was not realized. And with the image projection equipment of a configuration of projecting the conventional image sheet, it did not have the function which carries out record are recording of the above images picturized in presence.

[0008] Moreover, there is alternation or a case where it indicates by sequential projection at random or serially, about two or more images like the slide projector by the conventional optical film. Furthermore, there is a case where he wants arbitration to indicate the various image data accumulated in the past by playback at the time of a request. Although the configuration projected on a screen by storing the image data of two or more sheets in a personal computer, and making it send out and display on a reflective

mold liquid crystal panel in order was possible in the former, the personal computer had to be prepared, it had to connect with projection equipment, and such a configuration had a problem in mobility.

[0009] Furthermore, the function which compounds or superimposes three kinds of images of the image by the image sheet, the image picturized in presence on that spot, and the image by the various image data accumulated in the past, and is made to project on a screen was not realized.

[0010] This invention was made in order to solve the trouble in the above conventional techniques, and it aims at offering not only an image sheet but the image picturized in presence, and the image projection equipment in which projection of the accumulated image data and composition/superposition projection of the image of these two or more classes are possible.

[0011]

[Means for Solving the Problem] In order to solve the technical problem of the aforementioned conventional technique, the image projection equipment concerning this invention In the image projector which is made to modulate the flux of light emitted from the light source with the image sheet in which the image image appeared, is made to reflect said modulation light with a reflective mold liquid crystal panel, and is displayed on a screen By having the are recording function of image data, and the function to make said reflective mold liquid crystal panel indicate said accumulated image data by playback, and making said reflective mold liquid crystal panel indicate said accumulated image data by playback It is characterized by having made the image based on said image data, and the image image which appeared in said image sheet superimpose on said screen, and enabling the display of it.

[0012] By the aforementioned configuration, composition/superposition display of two kinds of images of the image by the accumulated image data and the image image which appeared in the image sheet is attained.

[0013] Or the image projection equipment concerning this invention is set to the image projector which is made to modulate the flux of light emitted from the light source with the image sheet in which the image image appeared, is made to reflect said modulation light with a reflective mold liquid crystal panel, and is displayed on a screen. By having an image pick-up function and the function to which said picturized image is displayed on said reflective mold liquid crystal panel, and displaying said picturized image data on said reflective mold liquid crystal panel It is characterized by having made said picturized image and the image image which appeared in said image sheet superimpose on said screen, and enabling the display of it.

[0014] By the aforementioned configuration, composition/superposition display of two kinds of images of the image picturized by presence during use and the image-image which appeared in the image sheet is attained.

[0015] Or the image projection equipment concerning this invention has the are recording function and said image pick-up function of said image data. And it has the function to display the function to make said reflective mold liquid crystal panel indicate said accumulated image data by playback, and said picturized image on said reflective mold liquid crystal panel. When the image based on said image data, said picturized image, and the image image which appeared in said image sheet are made to superimpose on said screen and it is constituted as a display being possible By the aforementioned configuration, composition/superposition display of three kinds of images of the image picturized by presence during use, the image by the accumulated image data, and the image image which appeared in the image sheet is attained.

[0016] Furthermore, the image projection equipment concerning this invention is set to the image projector which is made to modulate the flux of light emitted from the light source with the image sheet in which the image image appeared, is made to reflect said modulation light with a reflective mold liquid crystal panel, and is displayed on a screen. Constitute from an image pick-up unit which can be freely detached and attached on a body and said body, and said light source is built in said body at least. the function to make said reflective mold liquid crystal panel indicate the are recording function of image data, and said accumulated image data by playback at least at said image pick-up unit -- and an image pick-up function and the function to which said picturized image is displayed on said reflective mold liquid crystal panel -- and It is characterized by considering as the configuration in which the flux of

light which it had said reflective mold liquid crystal panel, and said image pick-up unit was emitted by said body from said light source at the time of wearing, and was modulated with said image sheet is reflected by said reflective mold liquid crystal panel.

[0017] According to the aforementioned configuration, the image pick-up unit of this invention can be removed from a body, and it can be used like small image pick-up machines, such as the conventional one apparatus video camera and an electronic "still" camera.

[0018]

[Embodiment of the Invention] Hereafter, the suitable operation gestalt of this invention is explained to a detail with reference to an attached drawing. In addition, although the operation gestalt described below is a part of suitable example of embodiment of this invention and desirable various limitation is attached on the technical configuration, especially the range of this invention is not restricted to these gestalten, as long as there is no publication of the purport which limits this invention in the following explanation.

[0019] Drawing 1 is the \*\* type front view of the first operation gestalt of the image projection equipment concerning this invention. Moreover, drawing 2 is the block block diagram of the important section of the image projection equipment shown in drawing 1.

[0020] As shown in drawing 1, the image projection equipment A which is the first operation gestalt of this invention The image sheet 11 The reflected light by the reflective mold liquid crystal panel 2 and the reflective mold liquid crystal panel 2 which are made to reflect the light source 9 arranged by the lower part of the carried sheet base 12, the optical system 8 which is arranged above the light source 9 and makes the flux of light parallel light, the optical system 8 which extracts flux of light 9b to which this parallel light penetrated the image sheet 11, and the extracted flux of light is expanded. It has the projection optics 10 made to project on a screen 13.

[0021] Moreover, Video RAM 3 is connected to the reflective mold liquid crystal panel 2. By this, the image image recorded on Video RAM 3 can be displayed on the reflective mold liquid crystal panel 2 as it is.

[0022] Furthermore, it has the data-processing means 5 which writes the image data reproduced from the videocassette 6 (are recording equipment) and the videocassette 6 as are recording equipment of image data in Video RAM 3. That is, the data-processing means 5 achieves the function to which the accumulated image data is displayed on a reflective mold liquid crystal panel.

[0023] Or it has the data-processing means 4 which writes the signal from/and the lens 7 which catches a photographic subject 21, the image sensor 20 changed into an electrical signal based on the optical input from a lens 7, and an image sensor 20 in Video RAM 3. That is, the data-processing means 4 achieves the function to which the photoed image data is displayed on a reflective mold liquid crystal panel.

[0024] According to this image projection equipment A, the image sheet 11 put on the sheet base 12 as an parallel light by optical system 8 in the light emitted from the light source 9 is made to penetrate. Incidence of the transmitted light 9b modulated by the image image of the image sheet 11 is carried out to the reflective mold liquid crystal panel 2 which leaned about 45 degrees and was attached from incidence. With the electronic image pattern which the reflective mold liquid crystal panel 2 displays, a modulation is received, it is reflected in a direction about 90 degrees from incidence, incident light passes along projection optics 10, and expansion projection is carried out here at a screen 13. As shown in drawing 2, let this be the 1st image 31.

[0025] If the image (the 2nd image 32 shown in drawing 2) accumulated by the videocassette 6 and the data-processing means 5 which writes the image data reproduced from the videocassette 6 in Video RAM 3 is displayed on the reflective mold liquid crystal panel 2 here A screen 13 is overlapped on two kinds of images of the image image (the 1st image 31) of the image sheet 11, and the accumulated image (the 2nd image 32), and they are projected on it.

[0026] With or the data-processing means 4 which writes the signal from the lens 7 and image sensor 20 which caught the photographic subject 21, and an image sensor 20 in the reflective mold liquid crystal panel 2 at Video RAM 3 If the picturized image (the 3rd image 33 shown in drawing 2) is displayed, a screen 13 will be overlapped on two kinds of images of the image image (the 1st image 31) of the image

sheet 11, and the image (the 3rd image 33) of the picturized photographic subject 21, and they will be projected on it.

[0027] Furthermore, the data-processing means 5 which writes the image data reproduced from the videocassette 6 and the videocassette 6 in the reflective mold liquid crystal panel 2 at Video RAM 3, With the lens 7 and image sensor 20 which caught the photographic subject 21, and the data-processing means 4 which writes the signal from an image sensor 20 in Video RAM 3 When a synthetic indication of the accumulated image and the picturized image is given, on a screen 13 The image image (the 1st image 31) of the image sheet 11, It is superimposed on three kinds of images with the synthetic image of the accumulated image (the 2nd image 32) and the image (the 3rd image 33) of the picturized photographic subject 21, and they are projected.

[0028] Thus, what is independent in either said 1st [ the ] or - the 3rd image 31-33, or combined these with arbitration can be set up free, and the image projection equipment concerning this operation gestalt can project it.

[0029] As are recording equipment of image data, the unit of 8mm videocassette, the unit by MD record medium, etc. are applied, for example. In addition, as shown in drawing 2 , a signal can carry out record are recording of the configuration sent to the videocassette 6 which is an are recording means, then the image picturized by presence during use immediately from a data-processing means 4 to process the picture signal from an image sensor 20.

[0030] Hereafter, it explains additionally per [ which is applied with the configuration of this invention ] reflective mold liquid crystal panel. If the reflective mold liquid crystal panel 2 is TN (torsion pneumatic) configuration or a STN (super torsion pneumatic) configuration, it exists between a polarization layer, the reflecting layer which was prepared in the flesh side of this polarization layer and which reflects incident light in the direction of a screen, the transparent electrode countered and arranged in the reflecting layer, and a reflecting layer and a transparent electrode, and has the liquid crystal which takes a light transmission condition and a light-scattering condition according to the signal impressed among both layers.

[0031] Or if it is the reflective mold liquid crystal panel configuration for which PDLC (polymer dispersed liquid crystal) was used in the liquid crystal layer, into the macromolecule medium with the transparent liquid crystal drop which made liquid crystal the fine particle, homogeneity distributes and the liquid crystal layer is formed.

[0032] A liquid crystal layer is pinched with the transparent glass substrate equipped with the matrix of a transparent electrode, and the semi-conductor substrate which has the reflector which is a reflector, and it is constituted so that electric field may be impressed to a liquid crystal layer with these electrodes. Moreover, MOSFET corresponding to 1 to 1 is formed in the front face of a semi-conductor substrate in the shape of a matrix at each pixel.

[0033] Furthermore for color display, the color filter is prepared on the reflector, each one color filter of every of R, G, and B is prepared in three adjacent MOSFETs, respectively, and it becomes a full color display by displaying as a lot.

[0034] If electric field are impressed to a liquid crystal layer, an electrical potential difference will be impressed to a reflector because MOSFET will be in an ON state, and electric field will be built between the transparent electrodes by the side of a glass substrate. A set and permeability are raised by this electric field and the orientation of the liquid crystal drop distributed becomes transparence by it. Consequently, total reflection of the light which carried out incidence from the glass substrate is carried out with a reflector, and it turns into the reflected light to the exterior from a glass substrate.

[0035] Thus, the pixel to which electric field were impressed is seen from a glass substrate side, and will be in a total reflection condition. The condition that the orientation of a liquid crystal drop pointed out various directions on the other hand in the liquid crystal layer which is the pixel to which electric field are not impressed is maintained, and, therefore, the permeability of light is low. Therefore, the incident light from a glass substrate has the low reflection factor which considered as the scattered light and was seen from the glass substrate side, and it is dark.

[0036] As each MOSFET which constitutes each pixel is the above, it forms the contrast of light and

darkness. When this controls turning on and off of MOSFET of each pixel corresponding to the inputted image data, an electronic image pattern will be displayed.

[0037] Therefore, since it becomes irregular with the pattern of an electronic image, the reflected light reflected from a liquid crystal panel can make a bright image pattern form on a screen by projecting the reflected light containing this electronic image pattern on a screen, if a beam of light is irradiated at the liquid crystal panel with which the electronic image pattern was displayed as mentioned above. If a reflective mold liquid crystal panel is made to incline, it especially arranges and incidence of the incident light is carried out from the upper part, the reflected light will form an image with high contrast.

[0038] Furthermore, since the transparency of a liquid crystal layer is high compared with TN liquid crystal etc., and the reflection factor of a liquid crystal panel is also excellent, therefore bright projection is made, by applying PDLC, PDLC serves as a high brightness image, also in the condition bright in a perimeter, can acquire good projection image quality and can raise the presentation effectiveness.

[0039] Below, the image by the transparency mold liquid crystal panel and how brightness and contrast project the image which is not enough even if it is a reflective mold liquid crystal panel are explained using the image projection equipment concerning this invention.

[0040] For example, the case where the image of the video game machine of a pocket mold is projected is explained. Since such a video game machine saves the life of a cell, its display of low brightness or low contrast is common, therefore it does not fit projection. Then, these images are photoed using an image pick-up function. That is, it considers that the image of the video game machine of a pocket mold is a photographic subject 21, and it is photoed. Then, the image of a pocket mold video game machine is displayed on a reflective mold liquid crystal panel in image projection equipment.

[0041] if the image projection equipment concerning this invention is used for the image displayed on the reflective mold liquid crystal panel of a small image pick-up machine -- high brightness -- and -- high -- since a contrast large-sized projection image is obtained, it will do in this way and the image of a pocket mold video game machine will be projected on a screen.

[0042] That is, the image projector style concerning the small image pick-up machine and this invention in this case functions as a converter which changes the image of a transparency mold into the image of a reflective mold. Or it will function as a converter which changes the image of the reflective mold liquid crystal panel of low brightness / low contrast display into the reflective mold image of high brightness and high contrast.

[0043] Below, the second operation gestalt of the image projection equipment concerning this invention is explained. Drawing 3 is the \*\* type front view, and drawing 4 is the \*\* type front view showing the example of a busy condition.

[0044] In both drawings, the image projection equipment A1 concerning the second operation gestalt of this invention consists of image pick-up units U which can be freely detached and attached on Body P and Body P. Body P is equipped with the light source 9, optical system 8, the sheet base 12, projection optics 10, etc.

[0045] The data-processing means 4 which writes the signal from Video RAM 3, a videocassette 6, the data-processing means 5 that writes the image data reproduced from the videocassette 6 in Video RAM 3, the lens 7 and image sensor 20 which caught the photographic subject 21, and an image sensor 20 in Video RAM 3 is carried in the image pick-up unit U.

[0046] Moreover, as shown in Body P at drawing 4, the stop sections R1-R5 which carry out the fitting stop of the image pick-up unit U are formed. These stop sections R1-R5 are arranged so that it may come to the location in which the flux of light which the image pick-up unit U was emitted by Body P from the light source at the time of wearing, and was modulated with the image sheet is reflected by the reflective mold liquid crystal panel.

[0047] Therefore, if the image pick-up unit U is removed from Body P, it can be used like small image pick-up machines, such as an one apparatus video camera and an electronic "still" camera.

[0048] Moreover, while using the reflective mold liquid crystal panel which the small image pick-up machine which carried the reflective mold liquid crystal panel or/like an one apparatus video camera and

an electronic "still" camera, and an image storage means conversely possesses as a reflecting mirror at the time of projection, it becomes possible to reproduce the picturized image and the accumulated image and to apply as the image source of a projection. That is, the one apparatus video camera of the former which carried the reflective mold liquid crystal panel, and an electronic "still" camera are applicable as an image pick-up unit of this invention.

[0049]

[Effect of the Invention] As having explained in full detail above, since the image projection equipment concerning claim 1 of this invention is equipped with the are-recording function of image data, and the function make a reflective mold liquid crystal panel indicate the accumulated image data by playback, it can make the image based on image data, and the image image appeared to an image sheet able to compound / superimpose on a screen, and can display by making a reflective mold liquid crystal panel indicate the accumulated image data by playback.

[0050] Since the image projection equipment concerning claim 2 of this invention is equipped with an image pick-up function and the function to which the picturized image is displayed on a reflective mold liquid crystal panel, can make the picturized image and the image image which appeared in the image sheet able to compound / superimpose, and it can display them on a screen by displaying the picturized image data on a reflective mold liquid crystal panel.

[0051] The image projection equipment concerning claim 3 of this invention has the are recording function and image pick-up function of image data. And the image based on the image data accumulated since it considers as the configuration which has the function to make a reflective mold liquid crystal panel indicate the accumulated image data by playback, and the function to display the picturized image on a reflective mold liquid crystal panel, It becomes possible to make the picturized image and three kinds of images with the image image which appeared in the image sheet superimpose on a screen, and to display them.

[0052] The image projection equipment concerning claim 4 of this invention modulates the flux of light emitted from the light source with the image sheet in which the image image appeared, and consists of image pick-up units which can be freely detached and attached on a body and this body in what is made to reflect modulation light with a reflective mold liquid crystal panel, and is displayed on a screen. The light source is built in a body at least, and, on the other hand, an image pick-up unit is equipped with the are recording function of image data, the function to make a reflective mold liquid crystal panel indicate the accumulated image data by playback, an image pick-up function, the function to display the picturized image on a reflective mold liquid crystal panel, and a reflective mold liquid crystal panel, at least. And an image pick-up unit is considered as the configuration in which the flux of light which was emitted by the body from the light source and modulated with the image sheet at the time of wearing is reflected by the reflective mold liquid crystal panel.

[0053] Thereby, an image pick-up unit can be removed from a body, and it can be used like small image pick-up machines, such as the conventional one apparatus video camera and an electronic "still" camera.

[0054] Moreover, while using the reflective mold liquid crystal panel which the small image pick-up machine which carried the reflective mold liquid crystal panel or/like an one apparatus video camera and an electronic "still" camera, and an image storage means conversely possesses as a reflecting mirror at the time of projection, it becomes possible to reproduce the picturized image and the accumulated image and to apply as the image source of a projection. That is, the one apparatus video camera of the former which carried the reflective mold liquid crystal panel, and an electronic "still" camera are applicable as an image pick-up unit of this invention.



## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] It is the \*\* type front view of the first operation gestalt of the image projection equipment concerning this invention.

[Drawing 2] It is the important section block block diagram of the image projection equipment shown in drawing 1.

[Drawing 3] It is the \*\* type front view of the second operation gestalt of the image projection equipment concerning this invention.

[Drawing 4] It is a \*\* type front view at the time of removing the image pick-up unit of the image projection equipment shown in drawing 3.

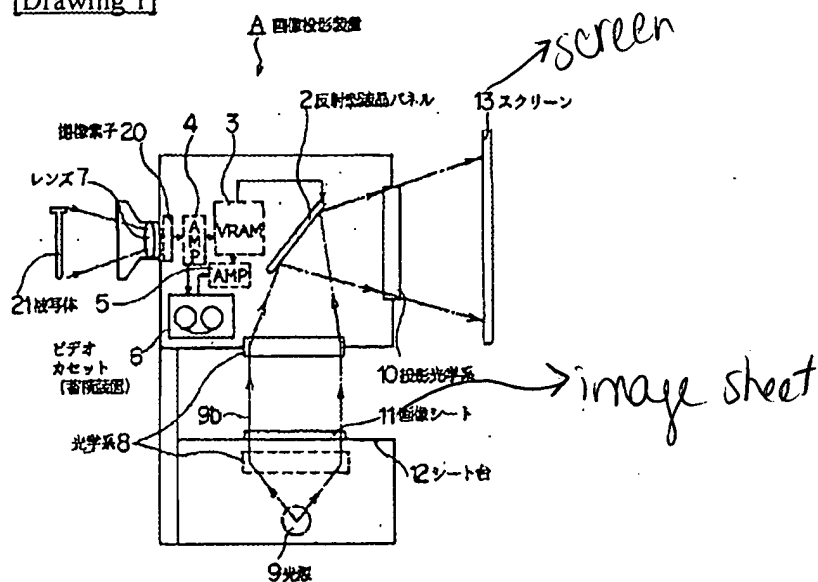
[Drawing 5] It is the \*\* type front view of conventional image projection equipment.

[Description of Notations]

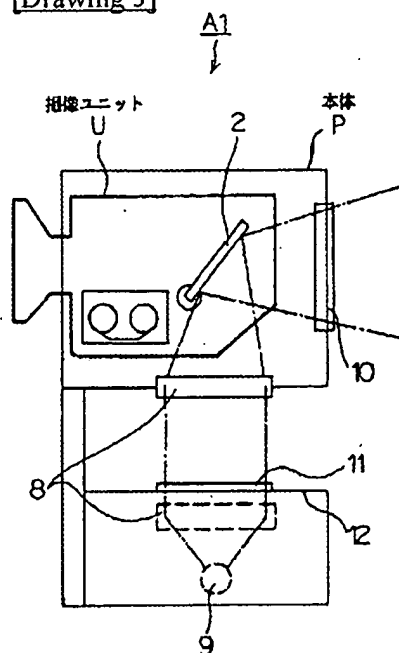
A [ -- A data-processing means, 6 / -- A videocassette (are recording equipment) 7 / -- A lens, 8 / -- Optical system, 9 / -- The light source, 9b / -- The flux of light, 10 / -- Projection optics, 11 / -- An image sheet, 12 / -- A sheet base, 13 / -- A screen, 20 / -- An image sensor, 21 / -- Photographic subject. ] -- Image projection equipment, a 2 -- reflective mold liquid crystal panel, 3 -- A Video RAM, 4 -- A data-processing means, 5

# DRAWINGS

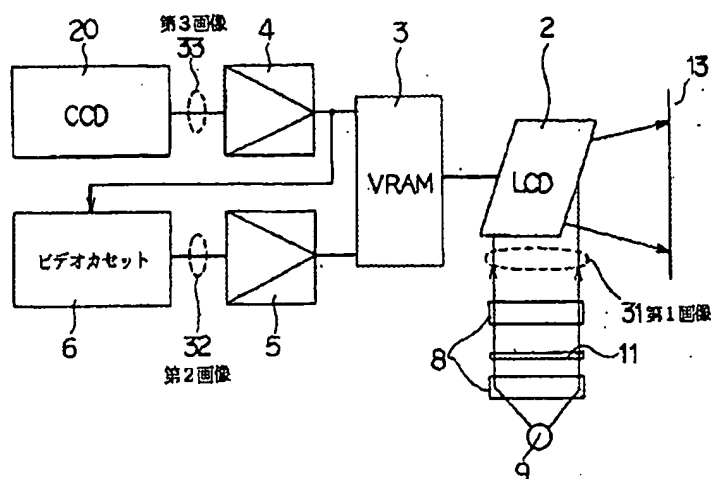
[Drawing 1]



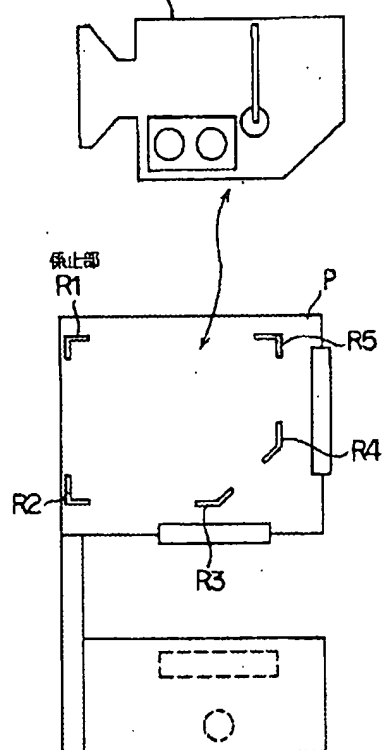
[Drawing 3]



[Drawing 2]



[Drawing 4]



[Drawing 5]

